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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,076	04/09/2002	Yasutaka Ogawa	020473	5822

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EXAMINER	
LUGO, DAVID B	

ART UNIT	PAPER NUMBER
2637	

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,076	OGAWA ET AL.	
	Examiner	Art Unit	
	David B. Lugo	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15* is/are allowed.

6)☒ Claim(s) *1-3,13,19 and 21-23* is/are rejected.

7)☒ Claim(s) *4-12,14,16-18 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to because in Figure 4 the output "$E_{k1}(t)$" from re-modulator RM_{K1} should be "$Y_{k1}(t)$".

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 17 (Fig. 21).

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application.

Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 5-14 and 16-23 are objected to because of the following informalities:

a. Claim 5, line 13, it is suggested that "first error determination means" be changed to --first error determining means--.

b. Claim 13, line 8, "interference removing unit" should be --interference removing units--.

c. Claim 14 references various limitations, such as "said signal extracting means" in lines 13-14, "said specific user" in lines 16, 19 and 21, "said parameter information" in line 16, and "said operating means" in lines 21-22. However, each of those limitations is introduced in both base claim 13 in addition to claim 14, so it is unclear which of the elements is being referred to, that is, for example, the signal extracting means from claim 13 or claim 14. It is suggested that claim 14 differentiate the different components of the "next stage of interference cancellers" from the "one stage of interference cancellers" of claim 13.

d. Claim 14 recites "the interference canceller of said first stage" in line 25, and "said first stage interference canceller" in line 30. These limitations lack antecedent basis in the claims, as it is unclear whether those limitations are referring to the "one stage of interference cancellers" recited in claim 13, line 5.

e. Similar to item c. above, claim 16 repeats limitations recited in claim 15, and it is suggested that claim 16 differentiate the different components of the "next stage of interference cancellers" from the "one stage of interference cancellers" of claim 15.

f. Similar to item d. above, claim 16 recites "said first stage interference canceller" in lines 26 and 31. These limitations lack antecedent basis in the claims, as it is unclear whether those limitations are referring to the "one stage of interference cancellers" recited in claim 15, line 5.

g. Claims 17 and 18 both recite, "said estimating means" in line 3 and "said error determining means" in line 5 of the respective claims, yet it is unclear whether it is referring to the elements of claim 13 or those of claim 14.

h. Claim 18 recites "the correlation value" in line 3. Claim 18 is a multiple dependent claim dependent from claims one of claims 13 to 16. When the claim is dependent from claim 13 or claim 14, it lacks sufficient antecedent basis for the limitation, as a correlation value is not recited in claim 13 or claim 14.

i. Claims 6-12 and 19-23 are objected to for depending from an objected claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 13 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki U.S. Patent 6,584,115 in view of Keskitalo et al. U.S. Patent 6,091,788.

Regarding claim 1, Suzuki discloses a reception system in Figure 7 including multiuser interference cancellers 41a-41c, an example of one interference canceller shown in Fig. 5, where the interference cancellers 41a-41c are comprised of a plurality of signal extracting means 23 for extracting signal components corresponding to the plurality of users, a plurality of estimating means 24 for estimating parameter information, a plurality of error determining means (quality comparison controller 32) for determining whether the signal components include a

demodulation error and providing such indication to the interference unit of a preceding block, and the reception system further comprises operating means which include subtractor 54 and adder 57 (ref. numbers listed in Fig. 3) for subtracting the extracted signal component determined by the error determining means 24, as a control signal is provided to an on/off controller 30 of the interference canceller such that if demodulation errors are present, the signal is not included for combination in the operating means (col. 12, lines 4-15). In the embodiment of Figure 7, the function of the estimating means is performed by central controller 66. However, one of ordinary skill in the art would recognize that either the central controller or the plurality of estimating means may be used as a matter of design consideration, as both provide control signals to respective interference cancellers in order to control respective on/off controllers 30.

Suzuki does not disclose that the system includes a plurality of antennas, and signal processing means for performing signal processing on the signals received by the antennas.

Keskitalo et al. disclose a reception system including an antenna array and signal processing means, as shown in Figure 4.

It would have been obvious to one of ordinary skill in the art to use an antenna array as disclosed by Keskitalo et al. in the system of Suzuki in order to improve the spectral efficiency of the system, as stated by Keskitalo et al. in column 3, lines 33-36.

Regarding claim 2, Suzuki further discloses a second stage of interference cancellers 42a-42c, an example of one interference canceller shown in Fig. 5, where the interference cancellers 41a-41c are comprised of a plurality of signal extracting means 23 for extracting signal components corresponding to the plurality of users, a plurality of estimating means 24 for

estimating parameter information, and a plurality of first error determining means (quality comparison controller 32) for determining whether the signal components include a demodulation error and providing such indication to the interference unit of a preceding block. In the embodiment of Figure 7, the function of the estimating means is performed by central controller 66. However, one of ordinary skill in the art would recognize that either the central controller or the plurality of second estimating means may be used as a matter of design consideration, as both provide control signals to respective interference cancellers in order to control respective on/off controllers 30.

Regarding claim 3, Suzuki further discloses that the reception system further comprises second operating means which include subtractor 55 and adder 59 (ref. numbers listed in Fig. 3) for subtracting the extracted signal component determined by the error determining means 24, as a control signal is provided to an on/off controller 30 of the interference canceller such that if demodulation errors are present, the signal is not included for combination in the operating means (col. 12, lines 4-15).

Regarding claim 13, Suzuki discloses a reception system in Figure 4 comprising a stage of interference cancellers including a plurality of interference removing units that comprise an ICU and a subtractor (e.g. 11a and 4), an example of an ICU shown in Fig. 5 to include signal extracting means 23 for extracting signal components corresponding to the plurality of users, a plurality of estimating means 24 for estimating parameter information, and error determining means (quality comparison controller 32) for determining whether the signal components include a demodulation error and providing such indication to the interference unit of a preceding block for disabling removal of the signal component by the operating means. The operating unit of the

interference removing units includes operating means 4 (Fig. 4) for removing the signal component corresponding to the specific user from the signal input to the signal extracting means. Suzuki further shows that the output of an operating unit of an interference removing unit (operating means 4) is applied to inputs of the signal extracting means and operating means of a latter stage interference removing unit.

Suzuki does not disclose that the system includes a plurality of antennas, and signal processing means for performing signal processing on the signals received by the antennas.

Keskitalo et al. disclose a reception system including an antenna array and signal processing means, as shown in Figure 4.

It would have been obvious to one of ordinary skill in the art to use an antenna array as disclosed by Keskitalo et al. in the system of Suzuki in order to improve the spectral efficiency of the system, as stated by Keskitalo et al. in column 3, lines 33-36.

Regarding claim 21, Suzuki in combination with Keskitalo et al. disclose a radio reception system as disclosed in accordance with claims 1 and 13 above, but do not expressly disclose that the signals are transmitted in accordance with a PDMA communication method. However, PDMA is a well known communication method, and implementation of PDMA in the system of Suzuki is deemed a design consideration that fails to patentably distinguish.

Regarding claim 22, Suzuki discloses that the signals are transmitted in accordance with a CDMA protocol.

Regarding claim 23, Suzuki discloses that the transmitted signals are spread by spreading codes on a transmitting side (col. 1, lines 19-22), and further discloses that the system comprises

inverse spreading means 22 for inverse spreading the signals and applying the results to the signal extracting means 23 (see Fig. 5, col. 2, lines 46-50).

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Keskitalo et al. as applied to claims 1 and 13 above, and further in view of Ishii et al. U.S. Patent 6,222,498.

Regarding claim 19, Suzuki in combination with Keskitalo et al. disclose a radio reception system as disclosed in accordance with claims 1 and 13 above, but do not expressly disclose that the signal extracting means is an adaptive array spatially separating and extracting signal components corresponding to specific users.

Ishii et al. disclose a reception system in Figure 5 including interference cancellation units 64a-64c, shown in Figure 6 to include signal extracting means (82a, 82b, 84) for spatially separating and extracting signal components corresponding to specific users according to antenna weights (col. 7, lines 29-33).

It would have been obvious to one of ordinary skill in the art to use the signal extracting means of Ishii et al. in the system of Suzuki in combination with Keskitalo et al. in order to maintain improved interference cancellation (see Ishii et al. col. 5, lines 38-47).

Allowable Subject Matter

8. Claim 15 is allowed.

9. Claims 5-12, 16-18 and 19-23 would be allowable if rewritten or amended to overcome the objections set forth in this Office action (when multiple dependent claims 19 and 21-23 depend from claims 5 or 15).

10. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to disclose estimating means for estimating parameter information based on a correlation value between a signal component of the corresponding user and the signal component of another user, as recited in claims 5 and 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Lugo whose telephone number is 571-272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Lugo
9/6/05

KHAI TRAN
PRIMARY EXAMINER